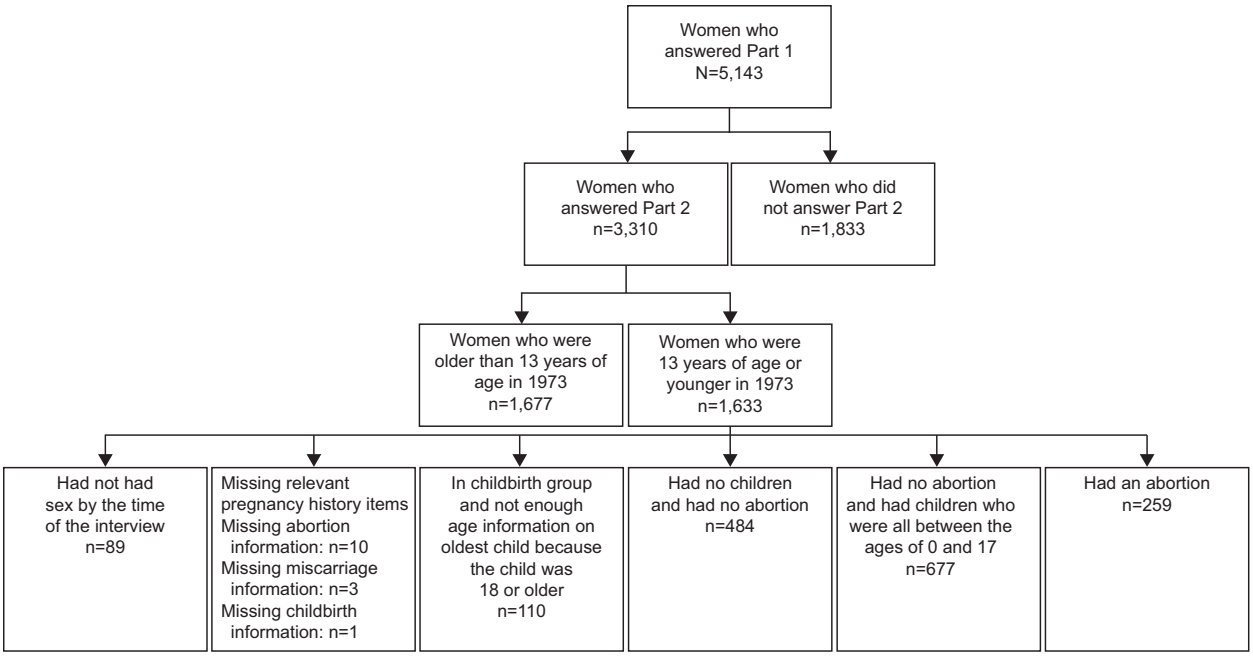
Appendix 1. Diagram of final unweighted sample



Steinberg JR, McCulloch CE, and Ader NE. Abortion and mental health: findings from the National Comorbidity Survey-Replication. Obstet Gynecol 2014;123.

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Appendix 2. Supplementary Analyses

We conducted supplementary analyses because we did not know women's exact age at their first childbirth for those who had childbirths and no abortions. This age is important, because it was used to determine when mental health problems and adversities occurred relative to women's first births (ie, before or after the first birth and number of years after first birth). National Comorbidity Survey-Replication data provide information on the number of children who were ages 4 and younger, between the ages of 5 and 12, and between the ages of 13 and 17. Therefore, we computed the oldest and youngest possible age at the time of the first childbirth for each woman who had childbirths and no abortions. The analyses (henceforth main analyses) presented in the paper use the youngest age at the time of the first childbirth.

We conducted two supplementary analyses to examine whether findings differed if we used other ages at the time of first birth. The first supplementary analysis imputed a woman's age at childbirth using the oldest possible age at the time of first childbirth. The second supplementary analysis pooled findings from a multiple imputation analysis. Per guidelines by Vittinghoff and colleagues[30], we randomly imputed age values between the youngest and oldest possible age at first birth for each woman in the first childbirth, no abortion group. We repeated this five times, creating five imputed datasets. We used this imputation model because the timing of the survey is unrelated to the age ranges used to record children's ages and so introduces a random distribution across the age range. For each of the six imputed datasets (five random and one oldest), the imputed age at childbirth was used to determine when mental health problems and other adversities occurred relative to women's first childbirth. We then ran Cox proportional hazard models for each dataset just as we did in the main analyses.

Pooled findings of the five randomly imputed age values produced the same findings as those in the main analyses (Appendix 4 below). The hazard ratios for the abortion compared with delivery coefficient were

significant in unadjusted models for the outcomes of anxiety disorders, substance use disorders, and suicidal ideation and marginally significant for mood disorders and eating disorders. In models which adjusted for prepregnancy adversities, age at pregnancy event, miscarriage history, race or ethnicity, education level, and childhood economic situation, all abortion compared with delivery hazard ratios were markedly reduced, and with the exception of substance use, all became nonsignificant. Hazard ratios were further reduced when prepregnancy mental health was added to the model, but that of substance use disorders remained significant.

When using the oldest possible age at first childbirth, the significant unadjusted associations between abortion and subsequent mental health was found for the outcomes of substance use disorders and suicidal behaviors (Table 3 below). These associations were reduced and became non-significant when adverse exposure history, miscarriage history, and sociodemographic factors were included in models. Further adjustment for prepregnancy mental health further reduced the abortion compared with delivery hazard ratios. In conclusion, pooled findings from the five randomly imputed values and findings from the oldest possible age at childbirth support the conclusions derived from the main findings.

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Appendix 3. Hazard Ratios (and 95% Confidence Intervals) of Fully Adjusted Models

	Anxiety Disorders	Mood Disorders	Impulse-Control Disorders	Substance Use Disorders	Eating Disorder	Suicidal Ideation
Pregnancy outcome						
Childbirth	1.00	1.00	1.00	1.00	1.00	1.00
Abortion	1.12 (0.87-1.46)	1.18 (0.88-1.56)	1.10 (0.75-1.62)	2.30* (1.35-3.92)	1.82 (0.63-5.25)	1.25 (0.88-1.78)
Prepregnancy mental health						
No disorders	1.00	1.00	1.00	1.00	1.00	1.00
One disorder	7.97* (5.34-11.92)	2.10* (1.30-3.38)	5.57* (2.92-10.61)	1.46 (0.69-3.10)	0.98 (0.23-4.23)	2.19† (1.09-4.41)
Two disorders	13.40* (8.18-21.97)	2.68* (1.65-4.36)	7.33* (4.02-13.33)	2.02 (0.97-4.22)	2.96 (0.69-12.60)	3.36* (1.86-6.05)
Three or more disorders	14.72* (9.39-23.08)	6.26* (4.63-8.46)	15.03* (8.77-25.74)	6.41* (3.48-11.81)	6.48* (1.93-21.77)	6.01* (3.74-9.68)
Prior adverse experiences						
None	1.00	1.00	1.00	1.00	1.00	1.00
One adversity	0.91 (0.69-1.20)	1.24 (0.79-1.92)	1.36 (0.77-2.39)	1.09 (0.64-1.85)	2.22 (0.55-8.88)	0.89 (0.52-1.53)
Two or more adversities	1.03 (0.82-1.30)	1.62† (1.13-2.34)	1.77† (1.15-2.71)	1.65† (1.03-2.63)	2.15 (0.71-6.50)	1.05 (0.63-1.75)
Race/ethnicity						
White	1.00	1.00	1.00	1.00	1.00	1.00
Black	0.89 (0.70-1.13)	0.84 (0.55-1.31)	0.95 (0.61-1.48)	0.39‡ (0.20-0.76)	0.98 (0.40-2.42)	0.98 (0.62-1.55)
Hispanic	1.05 (0.80-1.39)	0.74 (0.51-1.08)	1.42 (0.80-2.52)	0.87 (0.42-1.75)	0.76 (0.20-2.91)	1.28 (0.74-2.20)
Other	0.98 (0.67-1.42)	0.97 (0.54-1.74)	1.55 (0.92-2.62)	1.38 (0.63-3.02)	1.10 (0.22-5.65)	1.36 (0.69-2.71)
Childhood economic situation						
Not low	1.00	1.00	1.00	1.00	1.00	1.00
Low	1.00 (0.79-1.28)	0.90 (0.66-1.22)	0.78 (0.55-1.11)	1.03 (0.73-1.45)	1.47 (0.72-2.99)	1.03 (0.63-1.68)
Miscarriage history						
No miscarriage	1.00	1.00	1.00	1.00	1.00	1.00
Miscarriage	1.49† (1.01-2.19)	1.47 (0.98-2.22)	0.95 (0.56-1.60)	1.62 (0.80-3.30)	1.06 (0.28-3.99)	1.17 (0.52-2.64)
Age at target pregnancy	0.97† (0.94-0.99)	0..99 (0.96-1.02)	0.90* (0.86-0.93)	0.89* (0.85-0.94)	0.97 (0.89-1.05)	0.89* (0.83-0.95)

*$P < .005$.
†$P < .05$.

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Appendix 4. Pooled Hazard Ratios (and 95% Confidence Intervals) From Imputation Analyses of Abortion Compared With Delivery From Cox Proportional Hazard Models

Type of disorder	Model 1	Model 2	Model 3	Model 4
Anxiety disorders	1.18 (0.85-1.66)	0.92 (0.73-1.15)	1.21 (0.85-1.71)	0.92 (0.72-1.18)
Mood disorders	1.25 (0.99-1.59)	1.00 (0.79-1.25)	1.30† (1.01-1.66)	1.04 (0.79-1.37)
Impulse-control disorders	1.42 (0.86-2.33)	1.05 (0.69-1.60)	1.22 (0.79-1.89)	0.95 (0.64-1.42)
Substance use	2.95* (1.92-4.55)	2.37* (1.49-3.77)	2.36* (1.61-3.45)	2.09* (1.34-3.26)
Eating disorders	2.29 (0.98-5.34)	1.87 (0.74-4.70)	2.19 (0.80-5.99)	1.92 (0.69-5.40)
Suicidal ideation	1.69† (1.15-2.48)	1.37 (0.96-1.96)	1.31 (0.88-1.97)	1.14 (0.78-1.66)

*$P < .005$.

†$P < .05$.

Model 1 is unadjusted; Model 2 is adjusted for number of pregnancy mental health problems; Model 3 is adjusted for prepregnancy adversities, miscarriage before pregnancy event, race or ethnicity, age at pregnancy event, and childhood economic status; and Model 4 is adjusted for the factors in Models 2 and 3.

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Appendix 5. Hazard Ratios (and 95% CI) of Abortion Compared With Delivery From Cox Proportional Hazard Models With Oldest Possible Age as Age at First Childbirth

Type of disorder	Model 1	Model 2	Model 3	Model 4
Anxiety disorders	0.94 (0.68-1.31)	0.77† (0.62-0.95)	0.93 (0.64-1.34)	0.75† (0.61-0.92)
Mood disorders	1.02 (0.79-1.33)	0.86 (0.66-1.13)	1.01 (0.73-1.41)	0.88 (0.63-1.23)
Impulse-control disorders	1.38 (0.84-2.26)	1.13 (0.74-1.74)	1.05 (0.67-1.63)	0.92 (0.64-1.32)
Substance use	2.72* (1.71-4.31)	2.34* (1.43-3.85)	1.63† (1.05-2.52)	1.53 (0.91-2.56)
Eating disorders	1.82 (0.76-4.33)	1.60 (0.64-3.99)	1.84 (0.54-6.24)	1.69 (0.56-5.13)
Suicidal ideation	1.74† (1.12-2.69)	1.50† (1.01-2.22)	1.07 (0.55-2.08)	0.99 (0.60-1.65)

*$P < .005$.

†$P < .05$

Model 1 is unadjusted; Model 2 is adjusted for number of pregnancy mental health problems; Model 3 is adjusted for prepregnancy adversities, miscarriage before pregnancy event, race or ethnicity, age at pregnancy event, and childhood economic status; and Model 4 is adjusted for the factors in Models 2 and 3.

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